



# DNM 750 series

High Productivity Vertical Machining Center



# High Productivity Vertical Machining Center

The DNM 750 includes a spindle head cooling system which minimises thermal effects on the spindle. This enables a variety of medium to large parts to be machined to a high level of accuracy even at high speed. In addition, the roller guideways and high strength arch structure of the column provide a highly rigid frame for stable machining conditions.



## DNM 750 series

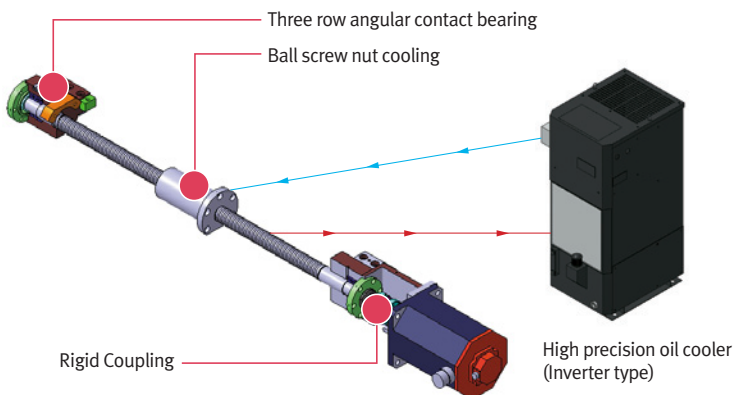


# Features

## 1 X-axis travel and spindle torque available for various applications

DNM 750/750L

- X-axis travel : 1630/2160 mm (64.2/85 inch)
- Spindle speed : 8000 r/min standard  
12000 r/min option
- Spindle torque : 117.1 N·m (86.4 ft.lb)
- Max. tool weight : 1500/1800 kg (3306.9/3968.3 lb)



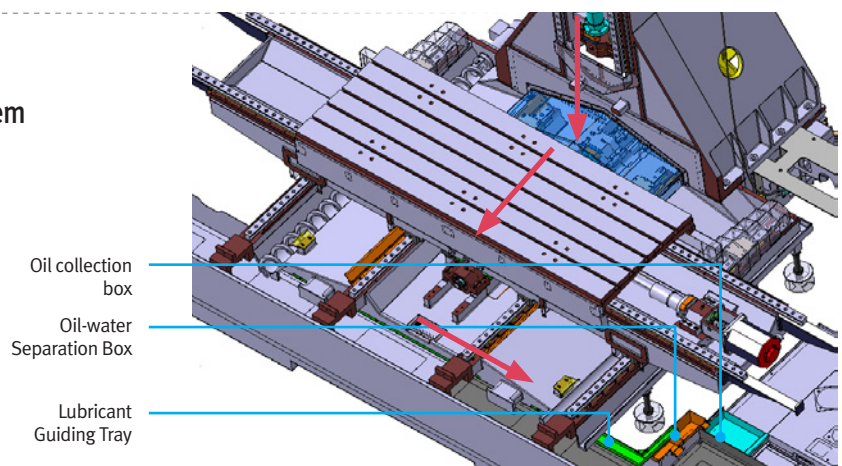
## 2 Cooling system to minimize thermal displacement

Thermal displacement of the spindle and axes is achieved by circulating cooling oil via an oil cooler to the spindle head and ball screw nuts.

- Spindle head cooling system standard
- Ball screw nut cooling system standard

## 3 Eco-friendly waste oil separation system

- Improved customer environment by separating waste lubricant and coolant.
- Reduced maintenance cost by extending the life of coolant by 80%

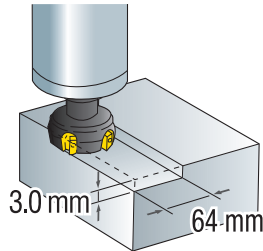




## High Productivity

### Machining capacity

Face mill\_Carbon steel (SM45C)  $\varnothing 80\text{mm}$  Face mill (6Z)

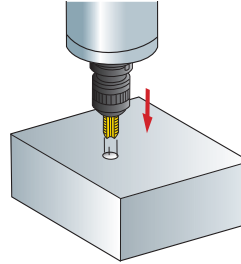


Machining rate  
**570 cm<sup>3</sup>/min**

Spindle speed  
1500 r/min

Feedrate  
2970 mm/min (116.9 ipm)

Tap\_Carbon steel (SM45C)



Machining rate  
**M30 x P3.5**

Spindle speed  
200 r/min

Feedrate  
700 mm/min (27.6 ipm)

### Rapid traverse

The linear motion guide ways and the high-speed servo motors enable fast axis movements, which reduce machining time and non-cutting time, resulting in enhanced productivity.



DNM 750

DNM 750L

X-axis	30 m/min (1181.1 ipm)	24 m/min (944.9 ipm)
Y-axis	30 m/min (1181.1 ipm)	24 m/min (944.9 ipm)
Z-axis	24 m/min (944.9 ipm)	24 m/min (944.9 ipm)

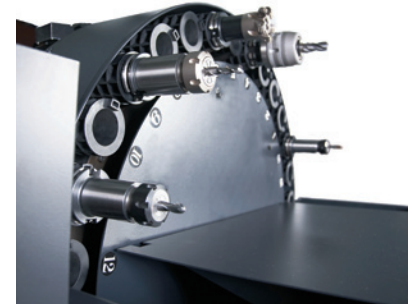
### Auto tool change

Fast tool change time using a cam-type tool changer helps improve productivity.



Tool change time (T-T-T)

**1.3 s**



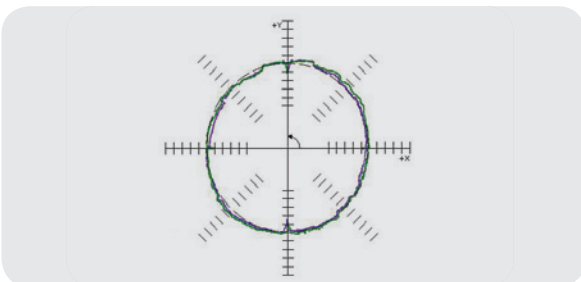
Tool storage capacity

**30 ea** standard

**40/60 ea** option

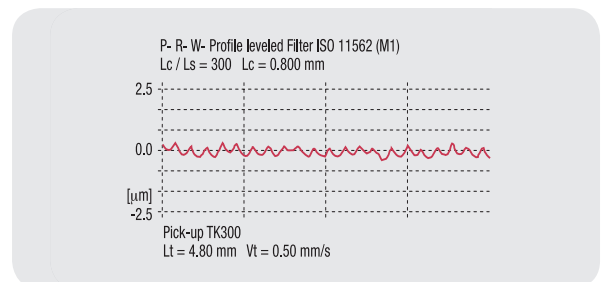
### Machining Accuracy

Ball bar test **4.7  $\mu\text{m}$**



Roughness **Ra 0.18  $\mu\text{m}$**

- Spindle speed : 8000 r/min
- Feedrate : 1200 mm/min (47.2 ipm)

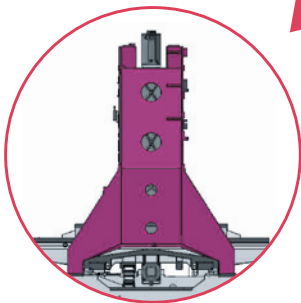




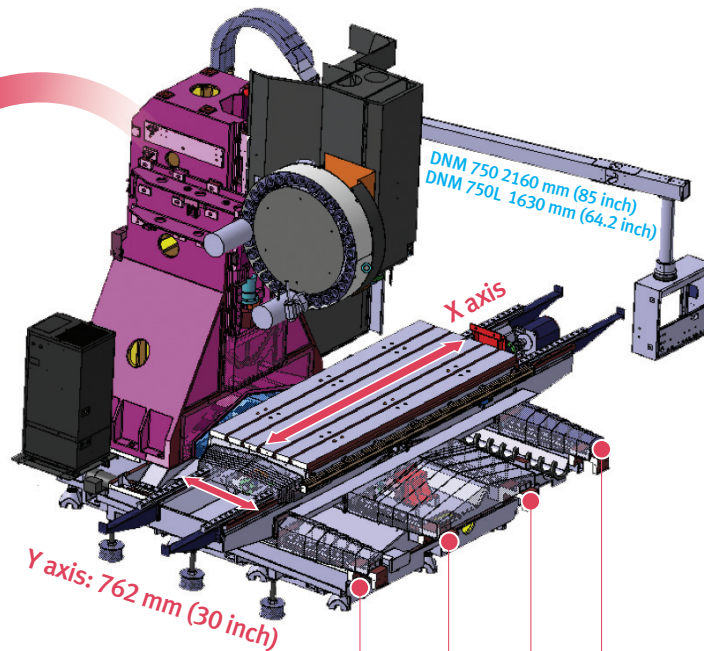
## High Rigidity Body

Key machine elements such as bed and column are made of Meehanite castings which have excellent vibration absorption characteristics and are designed to minimise deformation caused by heavy duty cutting. Roller type linear guideways are used to provide a combination of rigidity for heavy duty cutting and also high speed / high precision movement of each axis for high speed machining.

Arch-shaped structure

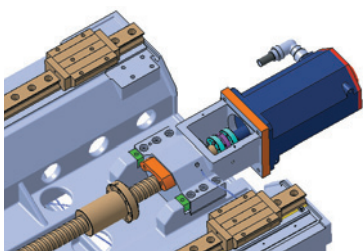


Key machine elements such as bed and column are designed to provide optimum rigidity for high speed / heavy duty machining.

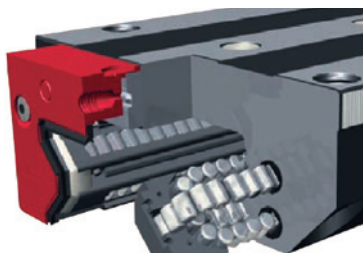


- The DNM 750L uses four roller guideways in the Y axis to eliminate overhang and provide optimum stability (DNM 750 has two roller guideways).

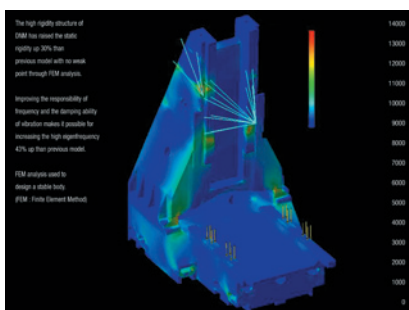
### High-strength roller type linear motion guide way



- High-stiffness Ball Screw & Coupling



- Strong 45 size roller type linear guide way



### Static rigidity

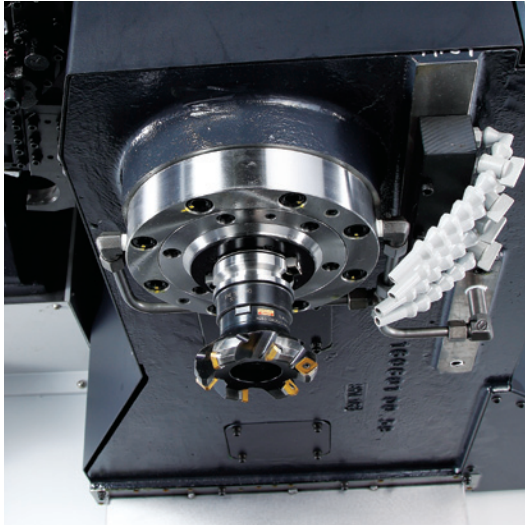
The high-rigid structure of DNM 750 series had raised the static rigidity up more than previous models through FEM analysis.

- FEM analysis used to design a stable body.  
(FEM : Finite Element Method)

### Dynamic stiffness

Dynamic analysis was used in simulations of actual cutting to improve dynamic stiffness and dampen vibration during design stage.

## High Speed Spindle



### Spindle

Spindle torque

**117.1 N·m (86.4 ft.lb)**

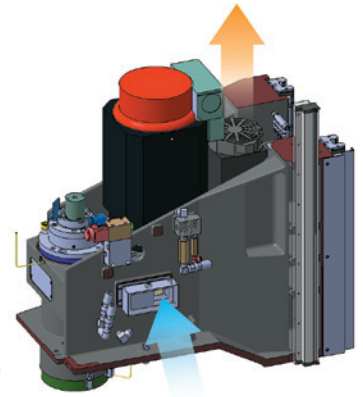
Spindle motor power

**15/18.5 kW (20.1 / 24.8 Hp)**

Spindle speed

**8000 r/min** standard

**12000 r/min** option



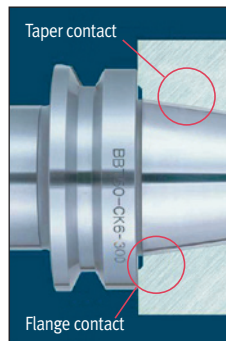
Air which has been heated by spindle running is forced from the spindle head casting by fan to reduce the risk of thermal deformation.

### Spindle head cooling system

The refrigerated spindle cooling system circulates cooling oil around the spindle bearings to maintain a constant temperature for high accuracy, regardless of ambient temperature.



### 2-Face locking tool system

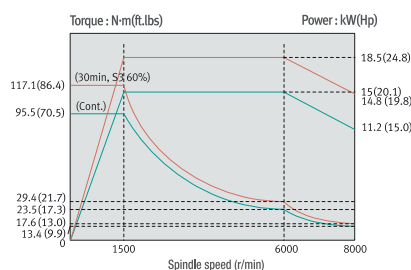


The 2-face locking tool system offers longer tool life, higher power and more precise machining by the dual contact to both of the spindle surface and toolholder flange surface, as well as both the spindle taper and toolholder taper shank. This system is based on the most currently available standards of BT, DIN, CAT and HSK flange tooling.

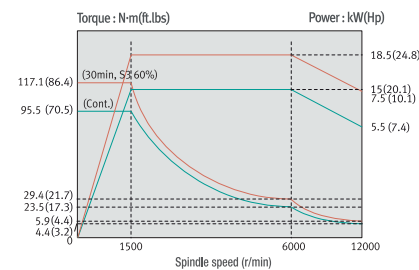
- Higher rigidity
- Improved ATC repeatability, surface finish and higher precision
- Extending tool life

### Spindle power-torque diagram

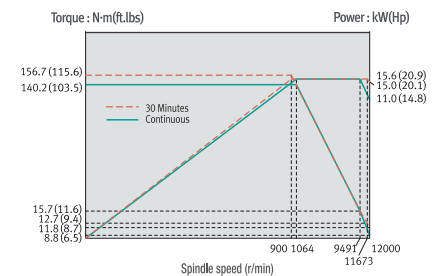
- Max. spindle speed : 8000 r/min
- Motor power : 15/18.5 kW (20.1 / 24.8 Hp)



- Max. spindle speed : 12000 r/min
- Motor power : 15/18.5 kW (20.1 / 24.8 Hp)



- Max. spindle speed : 12000 r/min
- Motor power : 15.6/15.6 kW (20.9 Hp)



## Operators Panel



### User-friendly control panel

The control panel has been consolidated into a operator-friendly and convenient layout

### PCMCIA card

The PCMCIA card is used for downloading programmes and uses a convenient slot in the CNC control panel.



### Portable MPG

Application suitable for CNC machines by providing home mode, stop adjustment and Interruption signal.



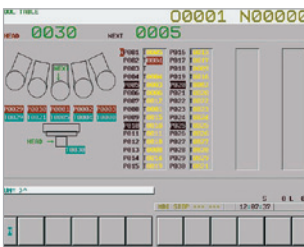
### USB port

A usb memory stick can be used for backup and restoring of CNC data. usb stick does not support DNC machine running.

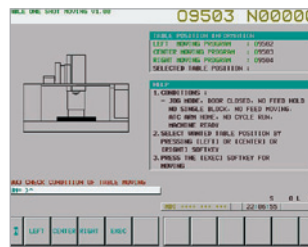


## Easy Operation Package

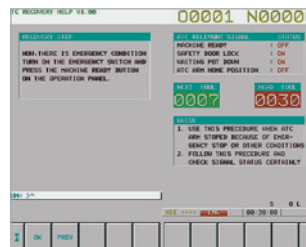
The Doosan easy operation package has been specially customized to provide user-friendly functions and control the magazine for tools and pallets.



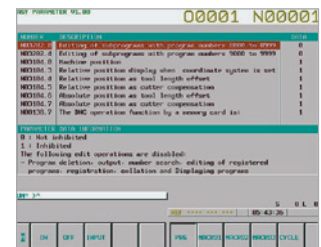
Tool table



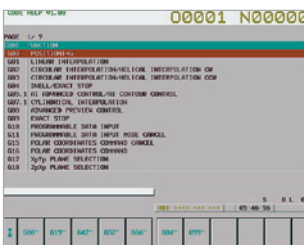
Work-piece set up  
table moving



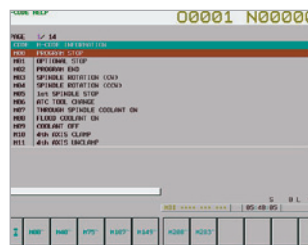
ATC recovery help



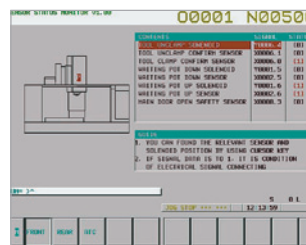
Easy parameter



G-code help



M-code help



Sensor status monitor



Tool load monitor

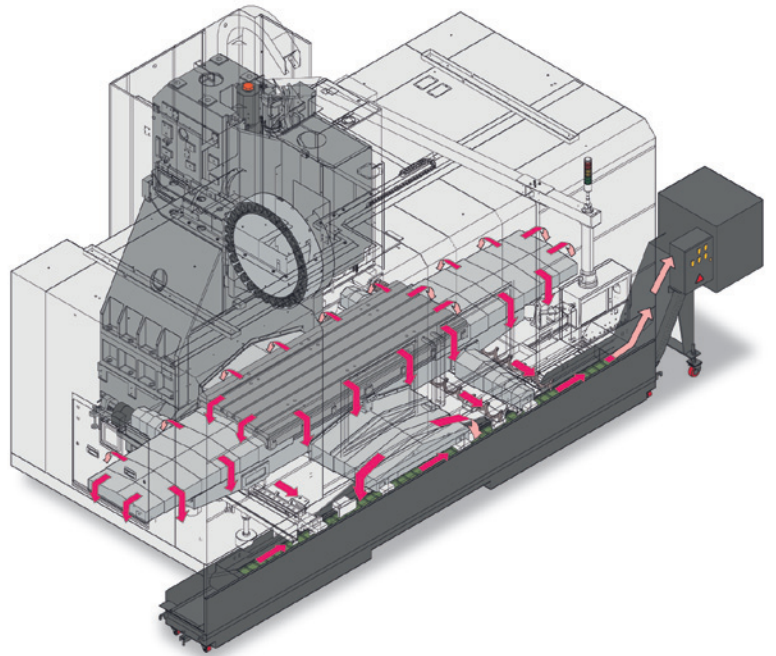
option



# Chip Disposal

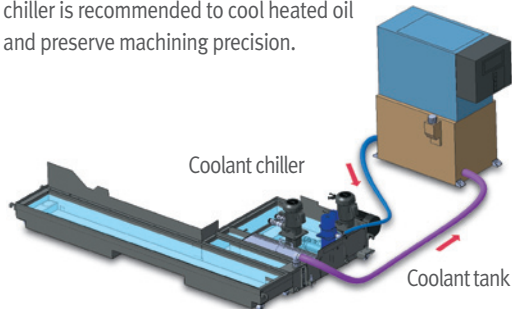
## Easy chip-removal structure

Separate chip conveyor and coolant tank provide for easy cleaning and maintenance. The completely enclosed DNM 750 series guarantees to keep the chips and coolant inside of the machining area. This provides a cleaner working area for the operator.

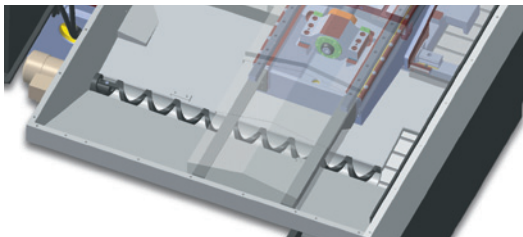


### Coolant chiller option

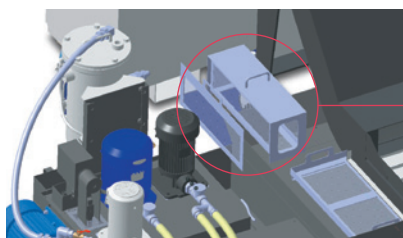
The coolant chiller lowers coolant temperature, helping to cool both the workpiece and tool during the machining operation. When using insoluble coolant, a coolant chiller is recommended to cool heated oil and preserve machining precision.



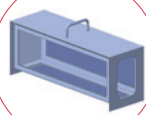
### Internal screw conveyor



### Large capacity coolant tank with chip pan and box filter

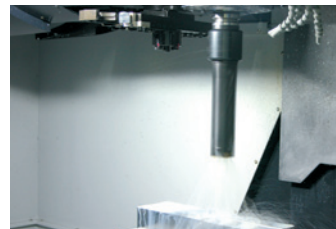


Coolant tank capacity : 480L



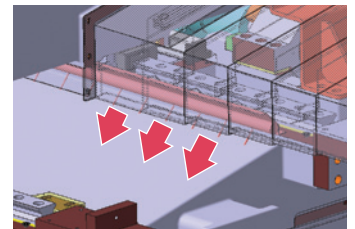
Easy to discard chips piled up

### Through spindle coolant option



Middle pressure : 2.0 MPa (20 bar)  
High pressure : 7.0 MPa (70 bar)

### Side flushing

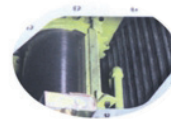


DNM 750 option  
DNM 750L standard

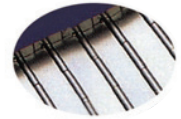
### Chip conveyor option



Scraper type



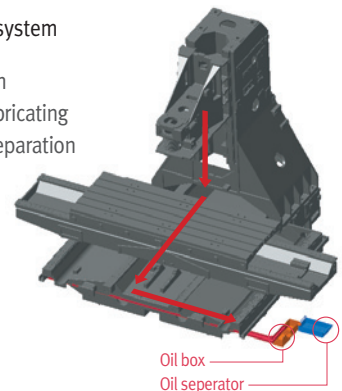
Drum filter type



Hinge type

### Used lubricating oil recovery system

Improved the coolant pollution environment by separating lubricating oil with a separate oil-water separation box mounted at the coolant tank to prevent lubricating and coolant from mixing.



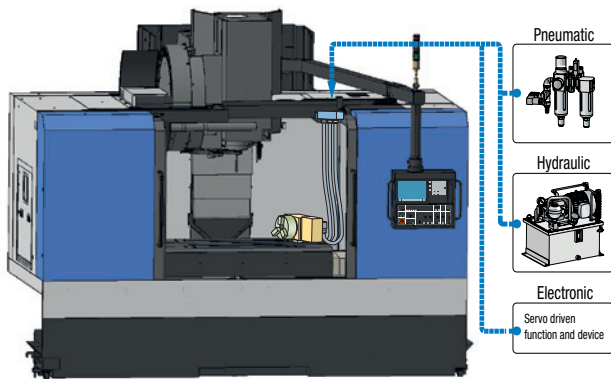
Oil box  
Oil separator

## Optional Equipment

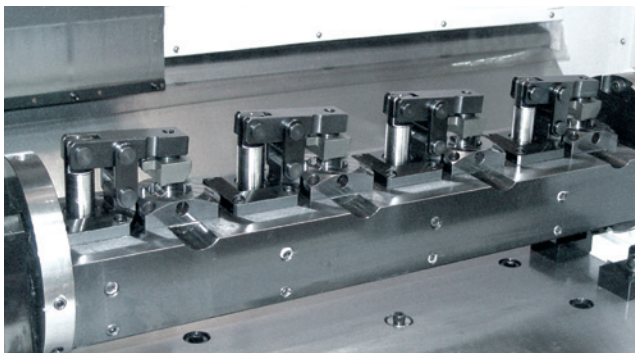
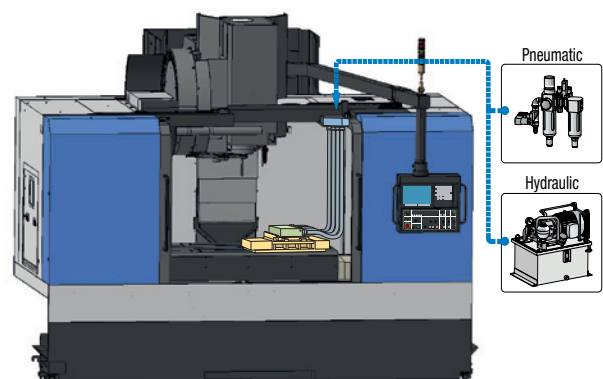
Various options available to meet customers' needs and to provide efficient work and convenience.

### Interface for additional equipment

Connection example of additional 1 axis interface



Connection example of fixture interface

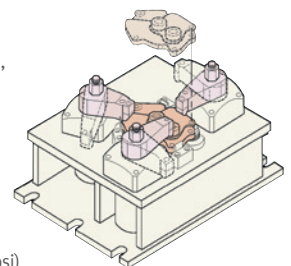


- Rotary table size shown in example :  $\varnothing 320$  (DNM 750)
- Hydraulic power unit may be additionally necessary according to rotary table specifications.

#### Fixture check list (for hydraulic / pneumatic fixtures)

- Pressure source
  - Hydraulic ☐ P/T ☐ A/B
  - Pneumatic ☐ P/T ☐ A/B
- Number of ports
  - ☐ 1pair (2-PT 3/8" port)
  - ☐ 2pair (4-PT 3/8" port)
  - ☐ 3pair (6-PT 3/8" port)
- Hydraulic power unit
  - Supply scope : ☐ User ☐ Doosan
 (Please check the below detail specification, if you want Doosan to supply.)

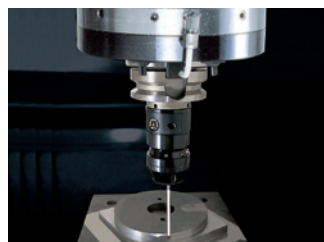
- ☐ Use Doosan standard unit  
24 L/min (6.3 gal/min) / 4.9 MPa (711 psi)
- ☐ Special requirement  
\_\_\_\_\_ L/min (gal/min) at \_\_\_\_\_ MPa (psi)



Automatic tool length measurement



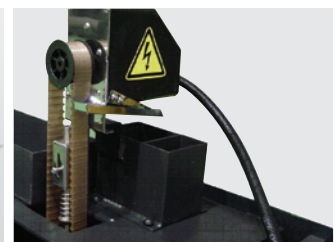
Automatic workpiece measurement



Minimum quantity lubrication



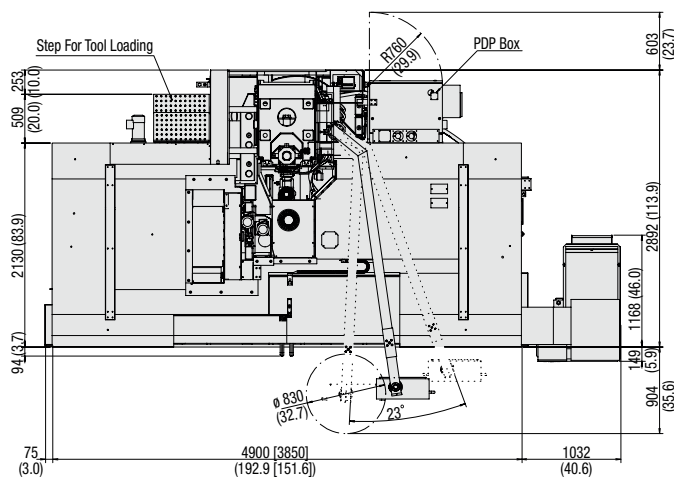
Oil skimmer



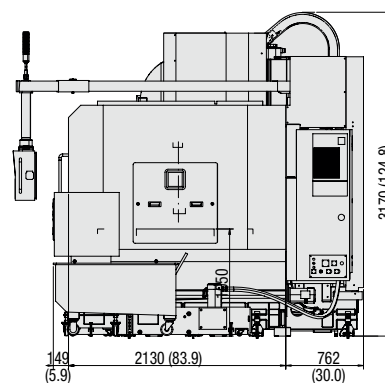
## External Dimensions

Unit : mm (inch)

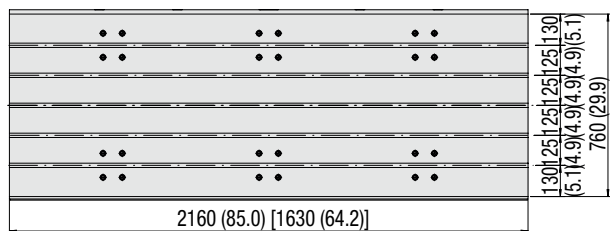
Top view



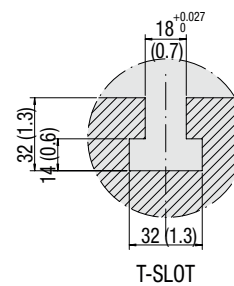
Side view



## Table dimensions

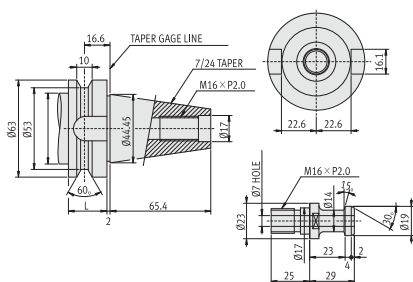


[ ]:DNM 750

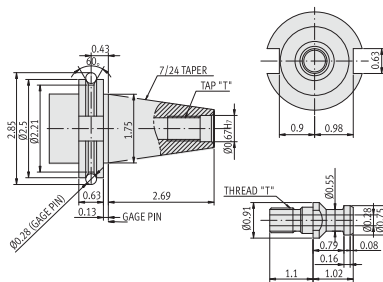


## Tool shank

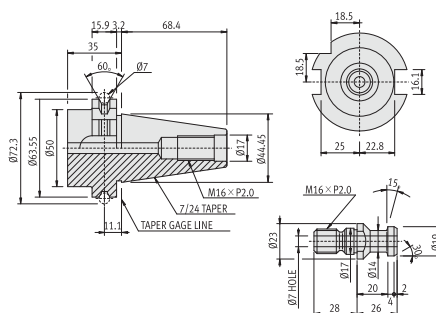
BT40



CAT40



DIN40





## Machine Specifications

Features		Unit	DNM 750	DNM 750L
Travel	X-axis	mm (inch)	1630 (64.2)	2160 (85.0)
	Y-axis	mm (inch)	762 (30.0)	
	Z-axis	mm (inch)	650 (25.6)	
Table	Distance from spindle nose to table top	mm (inch)	150-800 (5.9 - 31.5)	
	Distance from spindle center to column	mm (inch)	1050 (41.3)	
	Table size	mm (inch)	1630 x 760 (64.17 x 29.9)	2160 x 760 (85.0 x 29.9)
	Table loading capacity	kg (lb)	1500 (3306.9)	1800 (3968.3)
	Table surface	-	6-125 x 18H8	
Spindle	Max. spindle speed	r/min	8000 {12000}	
	Spindle taper	-	ISO #40 7/24 Taper	
	Max. spindle torque	N-m (ft.lb)	117.1 {165.7} (86.4 {115.6})	
	Spindle motor	kW (Hp)	15 / 18.5 {15.6 / 15.6} (20.1 / 24.8 {20.9 / 20.9})	
Feedrate	Rapid traverse rate (X/Y/Z)	m/min (ipm)	30/30/24 (118.1 / 118.1 / 94.9)	24/24/24 (94.9 / 94.9 / 94.9)
	Cutting feedrate	mm/min (ipm)	1-12000 (1-472.4)	
ATC	Type of tool shank	-	BT/CAT/DIN 40	
	Tool storage capacity	ea	30 {40/60}	
	Max. tool diameter [without adjacent tools]	mm (inch)	Ø80 [Ø125] (Ø 3.1 [4.9])	
	Max. tool length	mm (inch)	300 (11.8)	
	Max. tool weight	kg (lb)	8 (17.6)	
	Method of tool selection	-	memory random	
	Tool change time (tool-to-tool)	s	1.3	
	Tool change time (chip-to-chip)	s	3.7	
Utility	Electric power supply (Rated capacity)	kVA	43.1	
Machine size	Machine height	mm (inch)	3170 (124.8)	
	Machine dimension (L x W)	mm (inch)	3850 x 3435 (151.57 x 135.24)	4900 x 3435 (192.9 x 135.2)
	Machine weight	kg (lb)	13500 (29762.0)	15000 (33068.9)

Note : { } are optional.

### Standard feature

- Assembly & operation tools
- Coolant tank & chip pan
- Door interlock
- Full enclosure splash guard
- Flood coolant system
- Installation parts
- Oil skimmer
- Screw conveyor
- Signal tower (red, yellow, green)
- Portable MPG
- Spindle head cooling system
- Work light
- USB port, PCMCIA

### Optional feature

- Automatic power off
- Automatic tool length measurement
- Hydraulic line for fixture
- Pneumatic line for fixture
- Rotary table
- Test bar
- Through spindle coolant

## NC Unit Specifications

### Doosan fanuc i series

#### Axes control

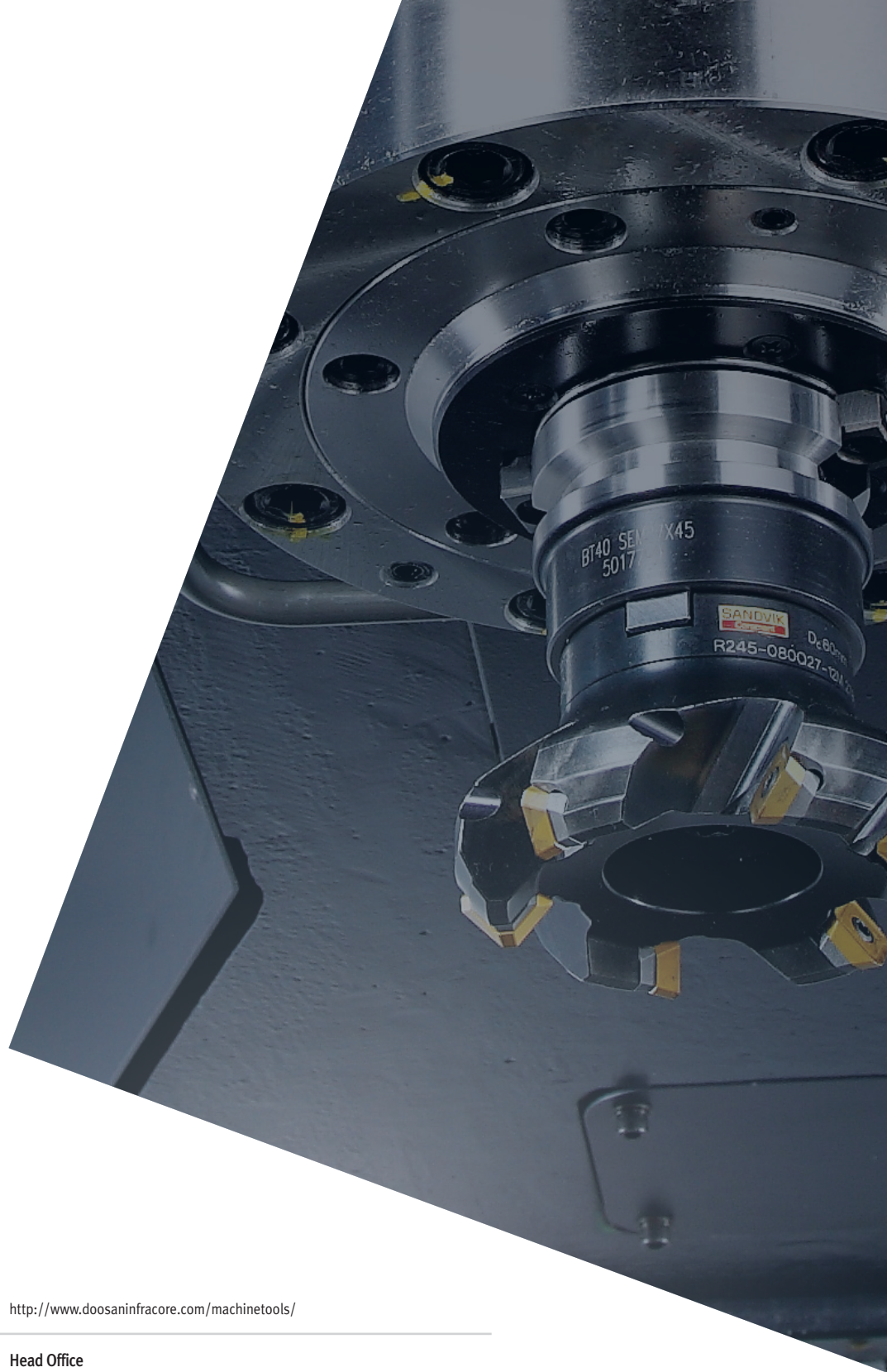
- Controlled axes	3 (X,Y,Z)
- Simultaneously controllable axes	Positioning (G00)/Linear interpolation (G01) : 3 axes Circular interpolation (G02, G03) : 2 axes
- Backlash compensation	
- Follow up	
- Least command increment	0.001mm
- Least input increment	0.001mm
- Machine lock	all axes/Z axis
- Mirror image	Reverse axis movement (setting screen and M-function)
- Stored pitch error compensation	Pitch error offset compensation for each axis
- Stored stroke check 1	Overtravel controlled by software
- Absolute pulse coder	

#### Interpolation & Feed funtion

- 2nd reference point return	G30
- Circular interpolation	G02, G03
- Cylindrical interpolation	G07.1
- Dwell	G04
- Exact stop check	G09, G61 (mode)
- Feed per minute	
- Feedrate override (10% increments)	0 - 200 %
- Helical interpolation	
- Jog override (10% increments)	0 - 200 %
- Linear interpolation	G01
- Manual handle feed	1 units
- Manual handle feedrate	x1, x10, x100 (per pulse)
- Override cancel	M48/M49
- Positioning	G00
- Rapid traverse override	F0 (fine feed), 25/50/100 %
- Reference point return	G27, G28, G29
- Skip function	G31



- Number of tool offsets : 400 ea
- Tool life management : 128 sets
- Tool offset memory C :  
Geometry / Wear and Length / Radius offset memory
- No. of Registered programs : 400 ea
- Part program storage : 1280 m
- Additional work coordinate system:  
G54.1 P1 - 48 (48 pairs)
- AICC1 : 40 block preview
- DISPLAY unit : 10.4" Color TFT LCD
- Embedded ethernet



## Doosan Infracore Machine Tools

<http://www.doosaninfracore.com/machinetools/>

### Head Office

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